

## Introduction

The XBK counters associated with detection products (photo-electric detectors, inductive sensors, limit switches) or dialogue products (pushbuttons, selector switches, etc) can be used to provide a complementary function of the control system : **counting**.

## Functions

XBK counters complement the Magelis range of display units and operator dialogue terminals by offering simple display and entry functions. They are fully compatible with labelled Telemecanique detection and man-machine dialogue products.

## Technology

The offer is divided between two technologies : electromechanics and electronics. Electromechanics is used for slow counting applications, of around several tens of hertz, whereas electronics is adapted to counting frequencies of around a kilohertz.

These two technologies can be subdivided into three distinct product families :

- **totalising counters,**
- **predetermining counters,**
- **totalising timers.**

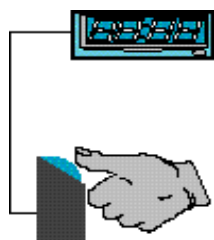
These three families offer products with varying characteristics :

- display capacity,
- type and number of outputs,
- types of input,
- reset to zero option,
- adding, subtracting, bidirectional or programmable counting mode,
- display in hundredths of an hour (hour counters).

This enables the products to be more application-specific.

## Applications

## Totalising counters



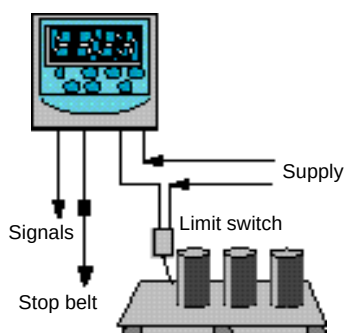
These are used for counting events from electrical pulses or contacts. The value is displayed and updated in increments on each new pulse.

**Application :** counting the number of parts

**In automatic mode :** the totalising counter performs this operation in conjunction with a photo-electric detector, inductive sensor or limit switch, which detects the passing of a part and translates this by adding one unit to the number of parts counted by the totalising counter.

**In manual mode :** the totalising counter performs this operation in conjunction with a pushbutton. A press on the button adds one more unit to the value displayed. This system can be used with a ticket distributor or a manual assembly station.

## Predetermining counters



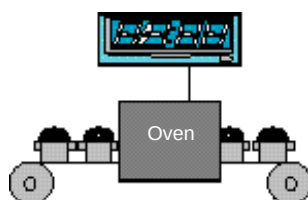
These are used for counting events from electrical pulses or contacts. The value is displayed and updated in increments or decrements on each new pulse.

They can be used to enter a preset value manually. When this predefined value is reached, they send an electrical signal. Predetermining counters can be adding or subtracting.

**Applications :** upcounting or downcounting the number of parts.

The predetermining counter counts the number of parts in the same way as a totaliser. When the selected value is reached, the preset counter, in conjunction with the various sensors, sends a signal to trigger actions, such as stopping a machine or conveyor belt.

## Totalising timers



These are used to count and display the time, with a precision of a hundredth of an hour.

**Applications :** they can be used to measure the duration of an action or of the use of a machine.

|                                                 |           |      |                                                                                                                                                                                        |                                          |                                                                      |                                          |
|-------------------------------------------------|-----------|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------|------------------------------------------|
|                                                 |           |      | XBK-T totalising counters                                                                                                                                                              |                                          | XBK-H totalising timer                                               |                                          |
| Type of device                                  |           |      | mechanical                                                                                                                                                                             |                                          | mechanical                                                           |                                          |
| Type of display                                 |           |      | LCD                                                                                                                                                                                    |                                          | LCD                                                                  |                                          |
| Environment                                     |           |      |                                                                                                                                                                                        |                                          |                                                                      |                                          |
| Conforming to standards                         |           |      | EN 50081-2, EN 50082-2                                                                                                                                                                 | EN 50081-2, EN 50082-2<br>EN 61010       | EN 50081-2,<br>EN 50082-2, VDE 0435                                  | EN 50081-2, EN 50082-2<br>EN 61010       |
| Product certifications                          |           |      | UL, CSA (pending)<br>except XBK-T60000U00M                                                                                                                                             | UL, C-UL (pending)                       | UL, CSA (pending)                                                    | UL, C-UL (pending)                       |
| Temperature                                     | Operation | ° C  | - 10...+ 50 except XBK-T60000U00M : - 10...+ 70                                                                                                                                        |                                          | - 10...+ 50                                                          |                                          |
|                                                 | Storage   | ° C  | - 20...+ 60 except XBK-T60000U00M : - 40...+ 85                                                                                                                                        |                                          | - 25...+ 70<br>- 20...+ 60                                           |                                          |
| Degree of protection<br>according to IEC 529    |           |      | IP 40 except<br>XBK-T60000U00M : IP 65                                                                                                                                                 | IP 54                                    | IP 65                                                                | IP 54                                    |
| Vibration resistance<br>according to IEC 68-2-6 |           |      | 5 gn (10 to 150 Hz)                                                                                                                                                                    | 1 gn (10 to 150 Hz)                      | 3 gn (10 to 150 Hz)                                                  | 1 gn (10 to 150 Hz)                      |
| Shock resistance<br>according to IEC 68-2-27    |           |      | 30 gn (6 ms)                                                                                                                                                                           | 10 gn (18 ms)                            | 30 gn (11 ms)                                                        | 10 gn (18 ms)                            |
| Protection against electric shocks              |           |      | Class II according to IEC 536                                                                                                                                                          |                                          |                                                                      |                                          |
| Mounting and fixing                             |           |      | Flush-mounting element                                                                                                                                                                 | Flush-mounting unit fixed<br>by a clamp  | Flush-mounting unit fixed by a self-locking<br>clamp                 |                                          |
| Connection                                      |           |      | By AMP lugs on a<br>cable connector                                                                                                                                                    | On screw terminal block                  |                                                                      |                                          |
| Characteristics                                 |           |      |                                                                                                                                                                                        |                                          |                                                                      |                                          |
| Supply voltage                                  |           | V    | c 24 ± 10 %<br>c 48 ± 10 %<br>a 115 ± 10 %                                                                                                                                             | Battery                                  | a 24 ± 10 % 50 Hz<br>a 115 ± 10 % 50 Hz<br>a 230 ± 10 % 50 Hz        | Battery                                  |
| Consumption                                     |           | W/VA | XBK-T50000U10M,<br>XBK-T50000U08M and<br>XBK-T70000U00M : 1.5<br>XBK-T50000U11M : 2.5<br>XBK-T60000U10M and<br>XBK-T80000U00M : 2.5<br>XBK-T60000U11M : 2.75<br>XBK-T60000U00M : 0.155 | –                                        | XBK-T70000001M : 0.56<br>XBK-T70000002M : 1<br>XBK-T70000004M : 0.08 | –                                        |
| Counting frequency                              |           | Hz   | 10, 20, 25                                                                                                                                                                             | 7500                                     | –                                                                    |                                          |
| Backup capacity                                 |           |      | Permanent                                                                                                                                                                              | 7 years                                  | Permanent                                                            | 7 years                                  |
| Number of digits                                |           |      | 5, 6, 7 or 8                                                                                                                                                                           | 8                                        | 7                                                                    | 8                                        |
| Precision of display                            |           |      | 99999... 99999999                                                                                                                                                                      | 99999999                                 | 99999.99 h                                                           | 999999.99 h                              |
| Character height                                |           | mm   | 4                                                                                                                                                                                      | 7                                        | 5                                                                    | 7                                        |
| Counting mode                                   |           |      | Adding                                                                                                                                                                                 | Adding<br>(Input resistance : 50 kΩ)     | Adding 1/100 of an hour                                              |                                          |
| Reset to zero                                   |           |      | With or without                                                                                                                                                                        | With                                     | Without                                                              | With                                     |
| Type of reset to zero                           |           |      | Manual                                                                                                                                                                                 | Manual with electric<br>locking          | –                                                                    | Manual with electric<br>locking          |
| Inputs                                          | Function  |      | Count                                                                                                                                                                                  |                                          | Enable                                                               |                                          |
|                                                 | Type      |      | Contact                                                                                                                                                                                | Transistor : PNP ≥ 8 V<br>or NPN ≤ 0.7 V | Contact                                                              | Transistor : PNP ≥ 8 V<br>or NPN ≤ 0.7 V |
|                                                 | Amplitude | V    | –                                                                                                                                                                                      | ± 40 V max                               | –                                                                    | ± 40 V max                               |
| Mechanical life                                 |           |      | 10 million pulses except<br>XBK-T60000U10M and<br>T80000U00M : 200 million                                                                                                             | –                                        | –                                                                    | –                                        |
| Minimum length of pulse                         |           | ms   | –                                                                                                                                                                                      | 15 at 30 Hz, 0.07 at 7.5 kHz             | –                                                                    | –                                        |

|                                              |           |                                                                          |                                                                                                                                                                                                                  |
|----------------------------------------------|-----------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type of device                               |           | XBK-P5                                                                   | XBK-P6                                                                                                                                                                                                           |
| Type of display                              |           | Mechanical                                                               | LED or LCD                                                                                                                                                                                                       |
| Environment                                  |           |                                                                          |                                                                                                                                                                                                                  |
| Conforming to standards                      |           | EN 50081-2 and EN 50082-2, EN 61010                                      |                                                                                                                                                                                                                  |
| Product certifications                       |           | XBK-P5pppDppM : CSA (pending)<br>XBK-P5pppUppM : UL/CSA (pending)        | UL, C-UL (pending)                                                                                                                                                                                               |
| Temperature                                  | Operation | ° C - 10...+ 50                                                          | 0...+ 50                                                                                                                                                                                                         |
|                                              | Storage   | ° C - 40...+ 85                                                          | - 20...+ 70                                                                                                                                                                                                      |
| Degree of protection according to IEC 529    |           | IP 40                                                                    | IP 65                                                                                                                                                                                                            |
| Vibration resistance according to IEC 68-2-6 |           | 5 gn (10 to 150 Hz)                                                      | 1 gn (10 to 150 Hz) according to IEC 68-2-6                                                                                                                                                                      |
| Shock resistance according to IEC 68-2-27    |           | 30 gn (6 ms)                                                             | 10 gn (18 ms) according to IEC 68-2-27                                                                                                                                                                           |
| Protection against electric shocks           |           | Class II according to IEC 536                                            |                                                                                                                                                                                                                  |
| Mounting and fixing                          |           | Removable, flush-mounting element<br>Fixing by screws on the front plate | Flush-mounting unit with fixing by self-locking clamp using needle screws                                                                                                                                        |
| Characteristics                              |           |                                                                          |                                                                                                                                                                                                                  |
| Supply voltage                               | V         | c 24 ± 10 %                                                              | c 24 or a 230 ± 10 % or a 115 ± 10 %                                                                                                                                                                             |
| Sensor supply voltage                        | V         | None                                                                     | c 12 to 24 (50 mA max) for XBK-P6pp30G32E or XBK-P6pp30G31E                                                                                                                                                      |
| Consumption                                  |           | 2.5 W                                                                    | 150 mA c 24 V, 50 mA a 230 or a 115 V                                                                                                                                                                            |
| Counting frequency                           | Hz        | 25                                                                       | 5000 (2500 on bi-directional counting)                                                                                                                                                                           |
| Number of digits                             |           | 5                                                                        | 6                                                                                                                                                                                                                |
| Display capacity                             |           | 99999                                                                    | 999999                                                                                                                                                                                                           |
| Character height                             | mm        | 4                                                                        | 7.6 (LED) or 9 (LCD)                                                                                                                                                                                             |
| Number of presets                            |           | 1                                                                        | 1 or 2                                                                                                                                                                                                           |
| Display of the preset                        |           | Adding (continuous)<br>or subtracting (non continuous)                   | Non continuous                                                                                                                                                                                                   |
| Counting mode                                |           | Adding or subtracting                                                    | 5 programmable modes :<br>- single counter input,<br>- single counter with phase discriminator,<br>- differential inputs,<br>- summing inputs,<br>- counting direction input.<br>(Counter input resistance 5 kΩ) |
| Reset                                        |           | Adding from zero<br>Subtracting from the preset value                    | 2 modes : reset to zero and reset to the preset value                                                                                                                                                            |
| Type of reset                                |           | Manual or manual and electric                                            | Manual, electric and automatic                                                                                                                                                                                   |
| Type of input signals                        |           | Contact (20 VA/220 V/1 A max)                                            | Transistor : PNP ≥ 8 V or NPN ≤ 2 V<br>Amplitude ± 40 V max                                                                                                                                                      |
| Type of outputs                              |           | Contact (volt-free)                                                      | Changeover relay (response time 5 ms) :<br>c 5 V < Uc < c 30 V<br>a 5 V < Uc < a 250 V<br>10 mA < I < 1 A<br>PNP transistor : at 12...24 V, 10 mA max                                                            |
| Connection                                   |           | By AMP lugs on a cable connector                                         | On screw terminal block                                                                                                                                                                                          |
| Minimum length of counting pulse             | ms        | —                                                                        | 17 at 30 Hz<br>0.1 at 5 kHz                                                                                                                                                                                      |

Counters

Totalising counters, predetermining counters and totalising timers

Totalising counters

With mechanical display

| Supply voltage | Number of display digits | Counting frequency | Type of reset to zero | Reference             | Weight |
|----------------|--------------------------|--------------------|-----------------------|-----------------------|--------|
| V              |                          | Hz                 |                       |                       | kg     |
| --- 24         | 5                        | 20                 | Manual                | <u>XBK-T50000U10M</u> | 0.100  |
|                | 6                        | 25                 | None                  | <u>XBK-T60000U00M</u> | 0.030  |
|                |                          | 25                 | Manual                | <u>XBK-T60000U10M</u> | 0.150  |
|                | 7                        | 20                 | None                  | <u>XBK-T70000U00M</u> | 0.100  |
|                | 8                        | 25                 | None                  | <u>XBK-T80000U00M</u> | 0.150  |
| --- 48         | 5                        | 20                 | None                  | <u>XBK-T50000U08M</u> | 0.100  |
| ~ 115          | 5                        | 10                 | Manual                | <u>XBK-T50000U11M</u> | 0.100  |
|                | 6                        | 10                 | Manual                | <u>XBK-T60000U11M</u> | 0.030  |

With LCD display

| Supply voltage | Number of display digits | Counting frequency | Type of reset to zero        | Reference             | Weight |
|----------------|--------------------------|--------------------|------------------------------|-----------------------|--------|
| V              |                          | kHz                |                              |                       | kg     |
| Battery        | 8                        | 7.5                | Manual with electric locking | <u>XBK-T81030U33E</u> | 0.050  |
|                |                          |                    |                              |                       |        |
|                |                          |                    |                              |                       |        |

Totalising timers

With mechanical display (max. display capacity : 99999.99 h)

| Supply voltage | Number of display digits | Supply frequency | Type of reset to zero | Reference             | Weight |
|----------------|--------------------------|------------------|-----------------------|-----------------------|--------|
| V              |                          | Hz               |                       |                       | kg     |
| ~ 24           | 7                        | 50               | None                  | <u>XBK-H70000004M</u> | 0.060  |
| ~ 115          | 7                        | 50               | None                  | <u>XBK-H70000001M</u> | 0.060  |
| ~ 230          | 7                        | 50               | None                  | <u>XBK-H70000002M</u> | 0.060  |

With LCD display (max. display capacity : 999999.99 h)

| Supply voltage | Number of display digits | Display mode     | Type of reset to zero        | Reference             | Weight |
|----------------|--------------------------|------------------|------------------------------|-----------------------|--------|
| V              |                          |                  |                              |                       | kg     |
| Battery        | 8                        | 1/100 of an hour | Manual with electric locking | <u>XBK-H81000033E</u> | 0.050  |
|                |                          |                  |                              |                       |        |
|                |                          |                  |                              |                       |        |



XBK-T50000U00M



XBK-T60000U00M



XBK-T60000U10M



XBK-T70000U00M



XBK-T80000U00M



XBK-T81030U33E



XBK-H70000000M



XBK-H81000033E

# Counters

Totalising counters, predetermining counters and totalising timers



XBK-P50100D●0M



XBK-P50100U●0M



XBK-P61●30G3●E



XBK-P62●30G3●E

## Subtracting predetermining counters with mechanical display

| Supply voltage | Number of display digits | Counting frequency | Number of presets | Type of reset       | Reference             | Weight |
|----------------|--------------------------|--------------------|-------------------|---------------------|-----------------------|--------|
| V              |                          | Hz                 |                   |                     |                       | kg     |
| --- 24         | 5                        | 25                 | 1                 | Manual              | <u>XBK-P50100D10M</u> | 0.200  |
|                |                          |                    |                   | Manual and electric | <u>XBK-P50100D20M</u> | 0.240  |

## Adding predetermining counters with mechanical display

|        |   |    |   |                     |                       |       |
|--------|---|----|---|---------------------|-----------------------|-------|
| --- 24 | 5 | 25 | 1 | Manual              | <u>XBK-P50100U10M</u> | 0.200 |
|        |   |    |   | Manual and electric | <u>XBK-P50100U20M</u> | 0.240 |

## Predetermining counters with LCD display

| Supply voltage | Number of display digits | Counting frequency | Number of presets | Type of reset                  | Reference             | Weight |
|----------------|--------------------------|--------------------|-------------------|--------------------------------|-----------------------|--------|
| V              |                          | kHz                |                   |                                |                       | kg     |
| --- 24         | 6                        | 5                  | 1                 | Manual, electric and automatic | <u>XBK-P61130G30E</u> | 0.150  |
|                |                          |                    | 2                 | Manual, electric and automatic | <u>XBK-P61230G30E</u> | 0.150  |
| ~ 115          | 6                        | 5                  | 1                 | Manual, electric and automatic | <u>XBK-P61130G31E</u> | 0.250  |
|                |                          |                    | 2                 | Manual, electric and automatic | <u>XBK-P61230G31E</u> | 0.250  |
| ~ 230          | 6                        | 5                  | 1                 | Manual, electric and automatic | <u>XBK-P61130G32E</u> | 0.250  |
|                |                          |                    | 2                 | Manual, electric and automatic | <u>XBK-P61230G32E</u> | 0.250  |

## Predetermining counters with LED display

| Supply voltage | Number of display digits | Counting frequency | Number of presets | Type of reset                  | Reference             | Weight |
|----------------|--------------------------|--------------------|-------------------|--------------------------------|-----------------------|--------|
| V              |                          | kHz                |                   |                                |                       | kg     |
| --- 24         | 6                        | 5                  | 1                 | Manual, electric and automatic | <u>XBK-P62130G30E</u> | 0.150  |
|                |                          |                    | 2                 | Manual, electric and automatic | <u>XBK-P62230G30E</u> | 0.150  |
| ~ 230          | 6                        | 5                  | 1                 | Manual, electric and automatic | <u>XBK-P62130G32E</u> | 0.250  |
|                |                          |                    | 2                 | Manual, electric and automatic | <u>XBK-P62230G32E</u> | 0.250  |

# Counters

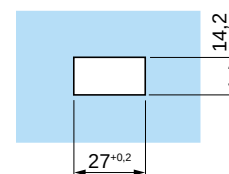
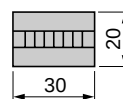
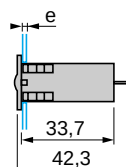
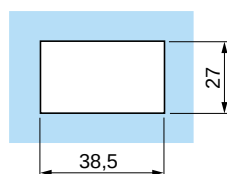
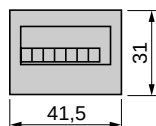
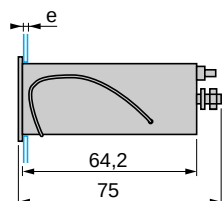
Totalising counters, predetermining counters and totalising timers

**XBK-T50000U●●M**  
**XBK-T70000U00M**

Flush-mounting

**XBK-T60000U00M**

Flush-mounting

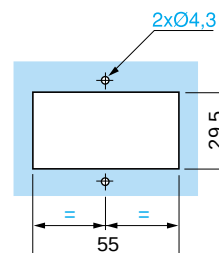
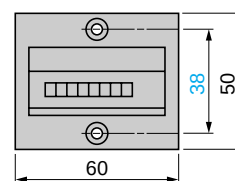
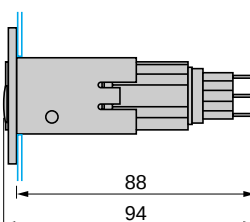
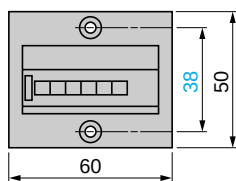
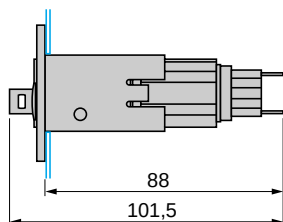


e : panel thickness, 1 mm < e < 2.5 mm.

**XBK-T60000U1●M**

**XBK-T80000U00M**

Flush-mounting  
(common)

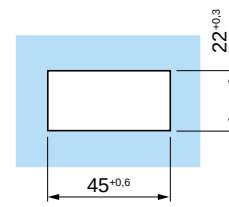
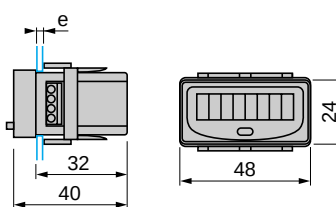
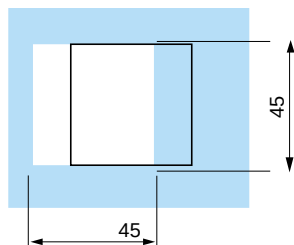
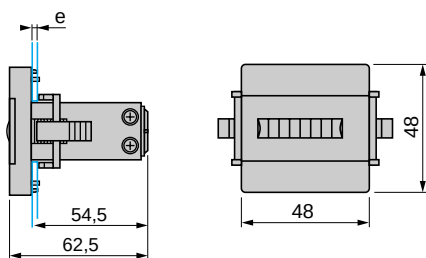


**XBK-H7000000●M**

Flush-mounting

**XBK-T81030U33E**  
**XBK-H81000033E**

Flush-mounting

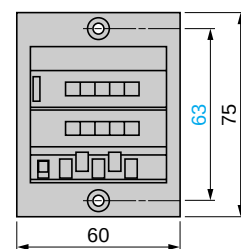
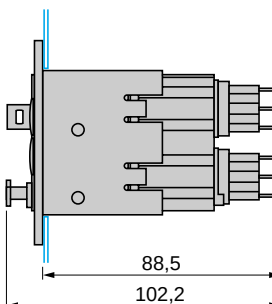
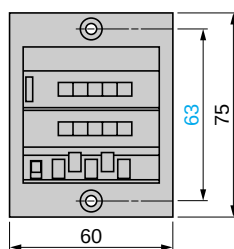
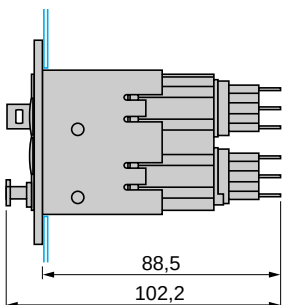


e : panel thickness, < 12 mm.

**XBK-P50100D●0M**

e : panel thickness, < 14 mm.

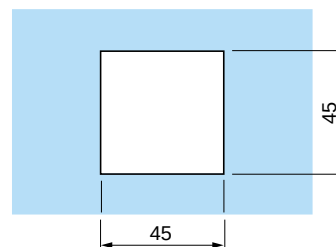
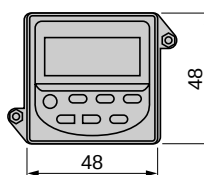
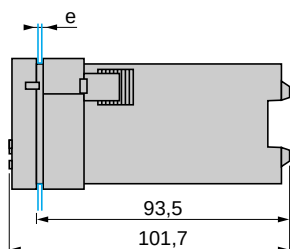
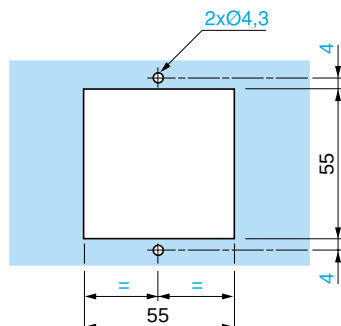
**XBK-P500100U●0M**



Flush-mounting (common)

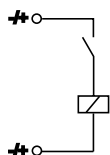
**XBK-P6●●30G3●E**

Flush-mounting

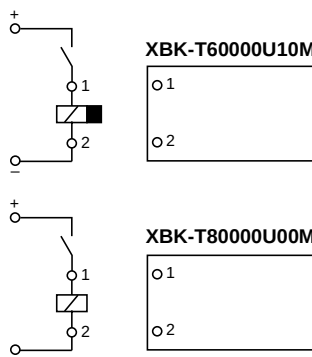


e : panel thickness, < 11 mm.

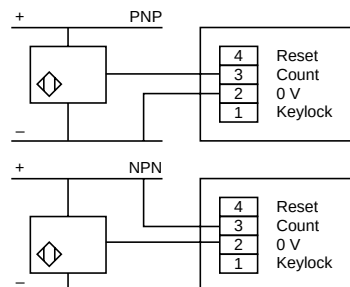
**XBK-T50000U●●M**  
**XBK-T70000U00M**



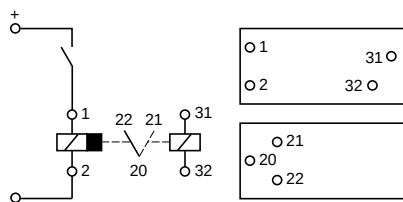
**XBK-T80000U00M**  
**XBK-T60000U1●M**



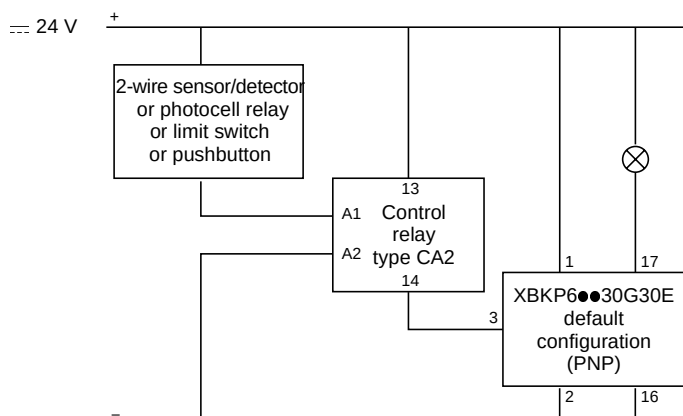
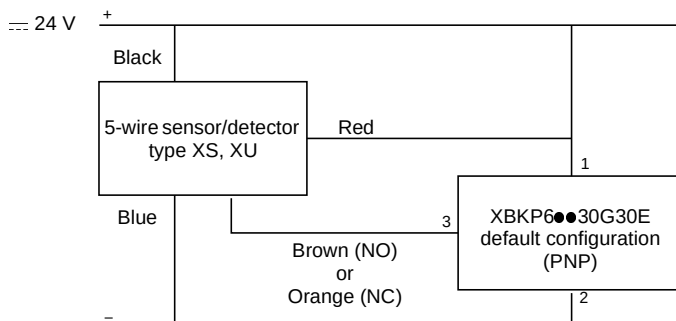
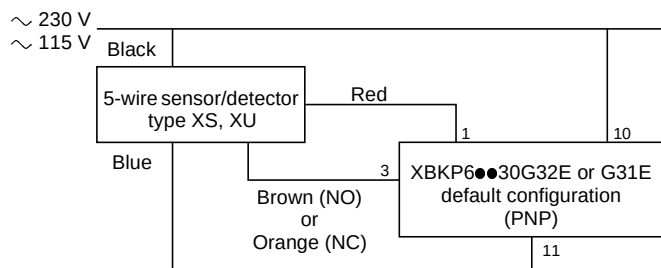
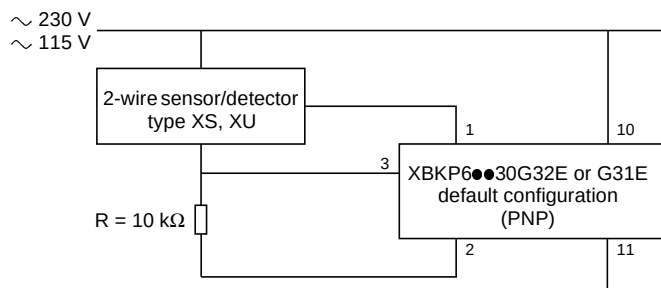
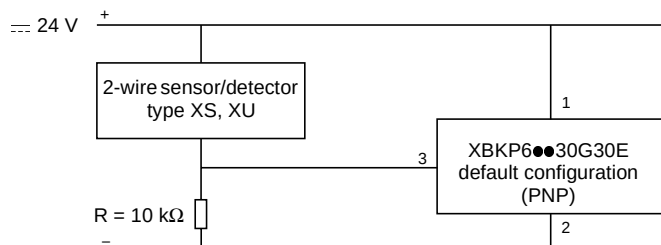
**XBT-T81030U33E**  
**XBK-H81000033E**



**XBK-P50100D●0M**  
**XBK-P50100U●0M**



**XBK-P6●●30G3●E**



## Electromechanical technology

|                                                                 | Totalising counter |         |        |                |         |                |
|-----------------------------------------------------------------|--------------------|---------|--------|----------------|---------|----------------|
|                                                                 | XBK-T5, XBK-T7     |         |        | XBK-T6, XBK-T8 |         | XBK-T6 compact |
| Type                                                            | Input              | Input   | Input  | Input          | Input   | Input          |
| Supply voltage                                                  | ≡ 24 V             | ~ 115 V | ≡ 48 V | ≡ 24 V         | ~ 115 V | ≡ 24 V         |
| Current consumption                                             | 70 mA              | 22 mA   | 32 mA  | 110 mA         | 24 mA   | 6 mA           |
| Power                                                           | 1.5 W              | 2.5 VA  | 1.5 W  | 2.5 W          | 2.75 VA | 0.155 W        |
| Inductive proximity sensors/<br>3-wire photo-electric detectors |                    |         |        | (2)            |         |                |
| Inductive proximity sensors/<br>2-wire photo-electric detectors | (1)                |         |        | (1)            |         |                |
| Photo-electric detectors, relay output                          |                    |         |        |                |         |                |
| Limit switches/<br>Pressure switches (volt-free contact)        |                    |         |        |                |         |                |
| Pushbutton controls (volt-free contact)                         |                    |         |        |                |         |                |
| PLCs: relay outputs                                             |                    |         |        |                |         |                |
| PLCs: solid state outputs                                       |                    |         |        |                |         |                |
| ELM Contactors/Relays<br>(up to 18 A)                           |                    |         |        |                |         |                |
| PLCs : inputs                                                   |                    |         |        |                |         |                |
| Pilot lights                                                    |                    |         |        |                |         |                |

|                                                                 | Predetermining counter |           |        | Totalising timer           |                            |                            |
|-----------------------------------------------------------------|------------------------|-----------|--------|----------------------------|----------------------------|----------------------------|
|                                                                 | XBK-P5                 |           |        | XBK-H7                     |                            |                            |
| Type                                                            | Input                  | Output    | Reset  | Input                      | Input                      | Input                      |
| Supply voltage                                                  | ≡ 24 VCC               | ≈ 220 V   | ≡ 24 V | ~ 24 V                     | ~ 115 V                    | ~ 220 V                    |
| Current consumption                                             | 110 mA                 | 1 A max   | 0.5 A  | 3 mA                       | 5 mA                       | 4 mA                       |
| Power                                                           | 2.5 W                  | 20 VA max | 12 W   | 0.08 VA                    | 0.56 VA                    | 1 VA                       |
| Inductive proximity sensors/<br>3-wire photo-electric detectors | (2)                    |           |        |                            |                            |                            |
| Inductive proximity sensors/<br>2-wire photo-electric detectors | (1)                    |           |        | (4)                        | (4)                        | (4)                        |
| Photo-electric detectors, relay output                          |                        |           |        |                            |                            |                            |
| Limit switches/<br>Pressure switches (volt-free contact)        |                        |           |        |                            |                            |                            |
| Pushbutton controls (volt-free contact)                         |                        |           |        |                            |                            |                            |
| PLCs: relay outputs                                             |                        |           |        |                            |                            |                            |
| PLCs: solid state outputs                                       |                        |           | (3)    |                            |                            |                            |
| ELM Contactors/Relays<br>(up to 18 A)                           |                        |           |        |                            |                            |                            |
| PLCs: inputs                                                    |                        |           |        |                            |                            |                            |
| Pilot lights                                                    |                        |           |        |                            |                            |                            |
| TEGO<br>(Reference of plate)                                    |                        |           |        | APD-1A21D44<br>APD-1A31D44 | APD-1A21D44<br>APD-1A31D44 | APD-1A21D44<br>APD-1A31D44 |

(1) Possible if volt drop &lt; 2.4 V (otherwise, boost the supply)

(2) Incompatible with sensors or photocells with protection against overloads &lt; 110 mA

(3) Possible if output current &gt; 0.5 A

(4) Possible with a 22 kΩ (2.5 W) resistor, fitted in parallel

 Possible combination Combination not possible or not applicable

## Electronic technology

|                                                                 | Totalising counter +<br>totalising timer       |                            | Predetermining counter                       |                                        |                            |                            |                            |
|-----------------------------------------------------------------|------------------------------------------------|----------------------------|----------------------------------------------|----------------------------------------|----------------------------|----------------------------|----------------------------|
|                                                                 | XBK-T8, XBK-H8                                 |                            | XBK-P6                                       |                                        |                            |                            |                            |
| Type                                                            | Input                                          | Reset to<br>zero           | Inputs                                       | Relay output                           | Solid state output         |                            | Sensor<br>supply           |
| Supply voltage                                                  | —                                              | —                          | —                                            | —                                      | — 24 V                     | ~ 220 V                    | ~ 115 V or<br>~ 230 V      |
| Voltage                                                         | State "1"<br>> — 5 V<br>State "0"<br>< — 0.7 V | State "0"<br>< — 0.7 V     | State "1"<br>> — 8 V<br>State "0"<br>< — 2 V | ~ 5 V min<br>— 30 V max<br>~ 250 V max | — 12-24 V                  | — 12-30 V                  | — 12-30 V                  |
| Resistance                                                      | 50 kΩ                                          | —                          | —                                            | —                                      | —                          | —                          | —                          |
| Current                                                         | —                                              | —                          | 10 mA max                                    | 10 mA min<br>1 A max                   | 10 mA max                  | 10 mA max                  | 50 mA max                  |
| Inductive proximity sensors/<br>3-wire photo-electric detectors |                                                |                            |                                              |                                        |                            |                            | (7)                        |
| Inductive proximity sensors/<br>2-wire photo-electric detectors | (1)                                            | (1)                        | (3)                                          |                                        |                            |                            | (7)                        |
| Photo-electric detectors, relay output                          | (2)                                            | (2)                        |                                              |                                        |                            |                            | (7)                        |
| Limit switches/<br>Pressure switches (volt-free contact)        | (2)                                            | (2)                        |                                              |                                        |                            |                            |                            |
| Pushbutton controls (volt-free contact)                         | (2)                                            | (2)                        |                                              |                                        |                            |                            |                            |
| PLCs: relay outputs                                             | (2)                                            | (2)                        |                                              |                                        |                            |                            |                            |
| PLCs: solid state outputs                                       |                                                |                            | (4)                                          |                                        |                            |                            |                            |
| ELM Contactors/Relays<br>(up to 18 A)                           | (2)                                            | (2)                        |                                              |                                        |                            |                            |                            |
| PLCs: Inputs                                                    |                                                |                            |                                              | (5)                                    | (6)                        | (6)                        |                            |
| Pilot lights                                                    |                                                |                            |                                              |                                        |                            |                            |                            |
| TEGO<br>(Reference of plate)                                    | APD-1A21D24<br>APD-1A31D24                     | APD-1A21D24<br>APD-1A31D24 | APD-1A21D44<br>APD-1A31D44                   | APD-1A21D44<br>APD-1A31D44             | APD-1A21D44<br>APD-1A31D44 | APD-1A21D44<br>APD-1A31D44 | APD-1A21D44<br>APD-1A31D44 |

- (1) Possible with a 680 Ω resistor fitted in parallel  
 (2) It is preferable to use contacts designed for low currents  
 (3) Possible with a 10 kΩ resistor fitted in parallel  
 (4) Possible if leakage current at state "0" < 0.5 mA  
 (5) Possible if input current > 10 mA  
 (6) Possible if input current < 10 mA  
 (7) Possible if current consumption < 50 mA

 Possible combination

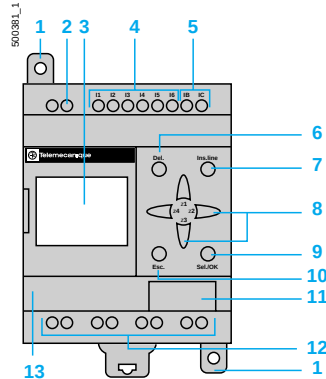
 Combination not possible or not applicable

## Presentation

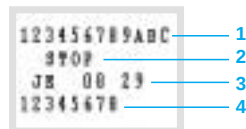
- The “Zelio Logic” smart relay is designed for use in small automated systems.
- It is suitable for use in both industrial sectors and commercial premises.
- Its compactness and ease of setting-up provide a competitive alternative to basic cable logic or specific card solutions.
- The ease of programming, ensured by the universality of the contact language, meets all automation requirements and also the needs of the electrician.
- The versions without display or buttons provide not only a competitively priced solution, but also the confidentiality of applications
- Programming can be carried out :
  - independently, using the buttons on the smart relay,
  - on a PC, using “Zelio Soft” software,
  - on a Pocket PC, using “Zelio Soft Pocket PC” software.

## Description

### SR1-A, SR1-B



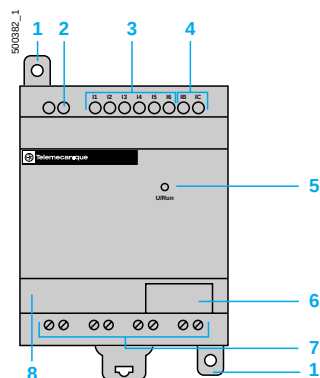
- 1 Retractable fixing lugs
- 2 Screw terminal supply connections
- 3 4 line, 12 character, LCD display
- 4 Screw terminal input connections
- 5 Screw terminal 0 – 10 V analogue input connections, suitable for discrete  $\approx$  24 V (only applicable to SR1-B)
- 6 Cancellation button
- 7 Line insertion button
- 8 Navigation buttons or Z button after configuration
- 9 Selection and validation button
- 10 Escape button (Esc.)
- 11 Slot for memory back-up and for transfer from one product to another (optional) or for smart relay/PC connecting cable
- 12 Screw terminal relay output connections
- 13 Location for re-usable label



### “Zelio Logic” main screen

- 1 Input status indication
- 2 Smart relay RUN or STOP mode indication
- 3 Indication of a parameter (date and time by default for smart relays with clock)
- 4 Output status indication

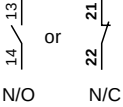
### SR1-D, SR1-E



- 1 Retractable fixing lugs
- 2 Screw terminal supply connections
- 3 Screw terminal input connections
- 4 Screw terminal 0 – 10 V analogue input connections, suitable for discrete  $\approx$  24 V (only applicable to SR1-E)
- 5 U/RUN : operating LED  
Steady : power on, Stop mode,  
Flashing : Run mode  
Fast flashing : relay fault
- 6 Slot for memory back-up and for transfer from one product to another (optional) or for smart relay/PC connecting cable
- 7 Screw terminal relay output connections
- 8 Location for re-usable label

### Back-up memory

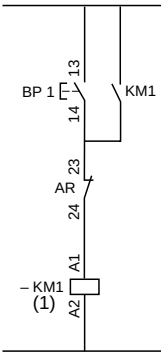
- Allows a programme to be copied into another smart relay (examples : for building identical equipment, remote transmission of updates).
- The memory also allows a back-up copy of the programme to be saved prior to exchanging the product.
- When used with a smart relay without display or buttons, the copy of the programme contained in the cartridge is automatically transferred into the smart relay at power-up.

| Contact language     |                                                                                                   |                                                                                         |                          |                                                                                                                                                                                                  |
|----------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Function             | Electrical scheme                                                                                 | Ladder language                                                                         | Zelio smart relay symbol | Notes                                                                                                                                                                                            |
| Contact              | <br>N/O      N/C | <br>or | Ix<br>or<br>ix           | I corresponds to the real state of the contact connected to the input of the smart relay.<br>i (or I) corresponds to the inverse state of the contact connected to the input of the smart relay. |
| Standard coil        |                  |        | Qx                       | The coil is energised when the contacts to which it is connected are closed.                                                                                                                     |
| Latch coil (Set)     |                  |        | SQ                       | The coil is energised when the contacts to which it is connected are closed.<br>It remains tripped when the contacts re-open.                                                                    |
| Unlatch coil (Reset) |                 |        | RQ                       | The coil is de-energised when the contacts to which it is connected are closed.<br>It remains inactive when the contacts re-open.                                                                |

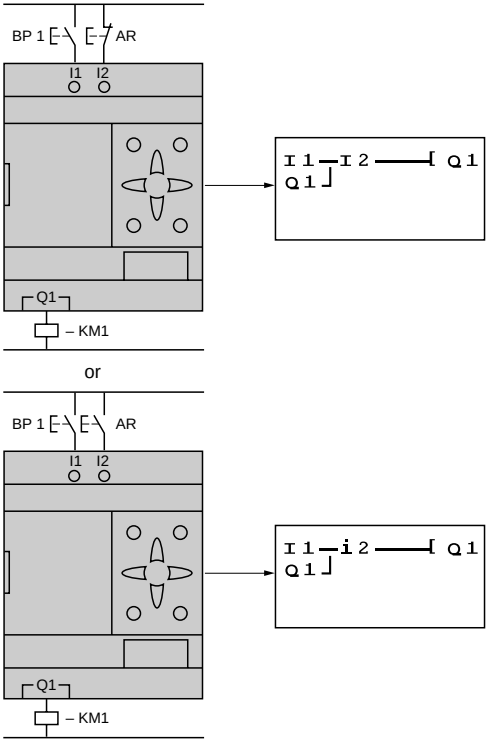
Example

Cabled logic

2 alternatives with Zelio smart relay



(1) KM1 = Q1

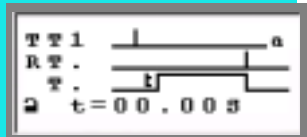


## Functions

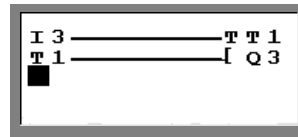
### The Zelio Logic smart relay comprises

- 8 or 10 **Time delay function** blocks, each with 8 choices of parametering,
- 8 or 10 **Counter function** blocks,
- 4 **Clock function** blocks, each comprising 4 channels.
- 8 **Analogue function** blocks, each with 7 choices of comparator parametering,
- 4 or 6 text function blocks (see Zelio Soft software page).

### Time delay function block



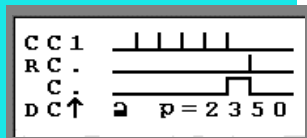
TT● : time delay control input  
RT● : time delay reset to zero  
T● : time delay output  
a : Zelio symbol/type of time delay  
s : time base  
t 00.00 : time delay value  
a : locking of time delay value



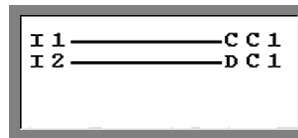
When inputting data to the **time delay function** block TT1, a window automatically opens for the inputting of the various parameters.

Depending on the smart relay reference, the time elapsed can be saved in the event of a power failure (remenance)

### Counter function block



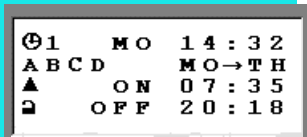
CC● : counting input  
RC● : counter reset to zero  
C● : counter output  
DC● : up/down counter selection  
p : preset value  
a : locking of preset counter value



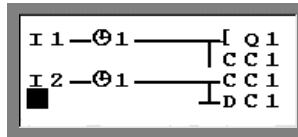
In the first programming line, each pulse at input I1 increments or decrements the counter C1.  
Input I2 determines the counting direction, either up or down.

Depending on the smart relay reference, the number of pulses already counted can be saved in the event of a power failure (remenance)

### Clock function block



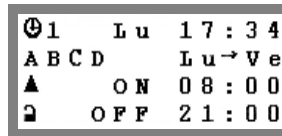
O1 : clock block output  
ABCD : time zones  
MO 14 : 32 : current date and time  
MO → TH : first day/last day  
ON : start time  
OFF : off time  
a : locking of time zones



The insertion of the clock block will enable output Q1 to change state in accordance with the preset time zones.

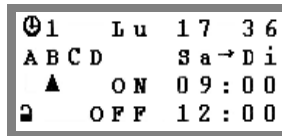
### Programming example with 2 time zones

#### Channel A time zone



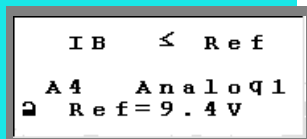
From Monday to Friday, the active time zone will be from 8 : 00 (ON) until 21 : 00 (OFF).

#### Channel B time zone

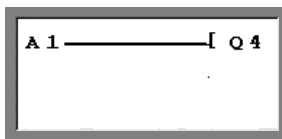


For Saturday and Sunday, the active time zone will be from 9 : 00 (ON) until 12 : 00 (OFF).

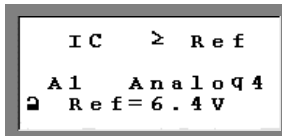
### Analogue function block



A4 : analogue block output  
Ref : reference voltage  
IB ≤ Ref : type of operation available  
a : locking of analogue block reference value



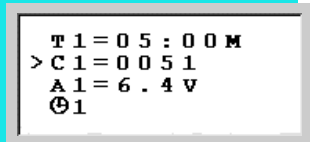
The analogue function block controls output Q 4 according to the result of the comparison.



In this example, output Q 4 changes state when the value of the analogue input IC is greater than the 6.4 V reference voltage.

Modes

Parameter entry mode



This mode allows centralising of all the parameters relating to unlocked function blocks that are used in the programme.  
Any of these parameters can be modified.

In this example, the user can modify :

- the preset time delay value T1,
- the preset counter value C1,
- the reference voltage of analogue block A1,
- the parameters of clock block n°1 (date, time zones).

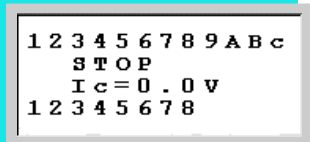
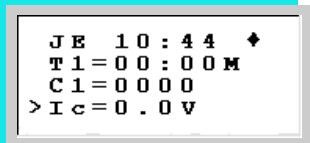
Display mode



This mode enables display of the current values of the various function blocks used in the programme. It is also possible to select one of these values for display on the screen instead of the date and time.

In this example, the user has the option of displaying the current values of :

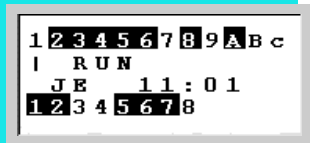
- the time delay T1,
- the analogue input IC,
- the counter C1.



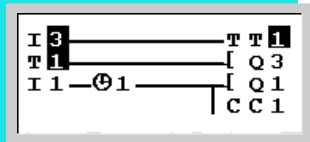
The value IC has been selected to be permanently displayed on the main screen instead of the date and time.

Diagnostic mode

This mode is accessible after the Zelio smart relay is set to RUN.



Main screen



Programming screen

Changing to programming mode allows all the active and inactive elements of the programme to be displayed.  
All active elements appear in reversed video.

## “Zelio Soft” software for PC (V1.5)

“Zelio Soft” software enables :

- inputting of control schemes,
- detection of any programming errors by means of its coherence test function,
- inputting of messages for display on the “Zelio Logic” smart relay,
- testing of programmes, with or without the smart relay connected to the PC.

### Input modes for control schemes

“Zelio input” mode enables users who have directly programmed the Zelio smart relay to find the same user interface, even when using the software for the first time.

“Free input” mode, which is more intuitive, is very user-friendly and incorporates many additional features.

Using Zelio Soft in “free mode” enables users to select their preferred symbol language from the following 3 alternatives :

- Zelio symbols,
- Ladder symbols,
- electrical symbols.

“Free input” mode also enables the creation of mnemonics and notes associated with each line of the programme. Instant switching from one input mode to the other is simply achieved, at any time, by clicking the mouse.

### Coherence test and application languages

Zelio Soft monitors applications via its coherence test function and turns red at the slightest input error. The problem can be located by simply clicking the mouse.

Zelio Soft allows switching between the 7 application languages (English, French, German, Spanish, Italian, Portuguese and Dutch) at any time, and editing of the application file in the selected language. It allows selection of the representation mode (Zelio, Ladder or electrical) for editing the file.

### Inputting messages for display on Zelio Logic

Zelio Soft allows 4 or 6 Text function blocks to be configured, corresponding to 4 or 6 screens of 4 lines x 12 characters, which can be displayed on all smart relays which have a display. These screens are activated in the same simple way as a coil in the control scheme. It is then possible to display messages as text only or to associate them with 1 or 2 variables, the latter being current values and/or setting values of function blocks used in the programme.

### Programme testing

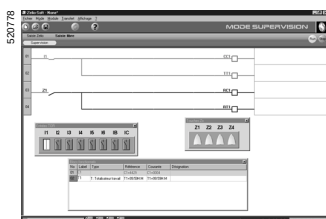
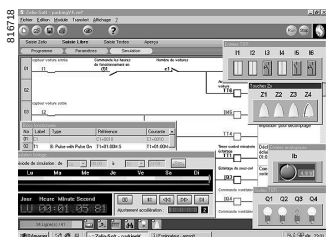
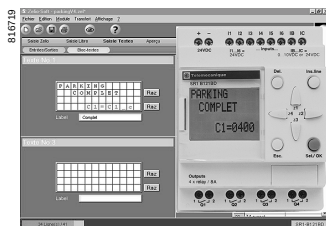
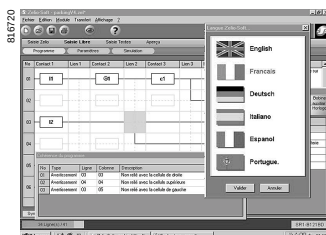
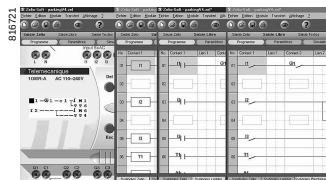
2 test modes are provided : simulation and supervision.

Zelio Soft **simulation** mode makes it possible to test all the programmes, without the smart relay, i.e. :

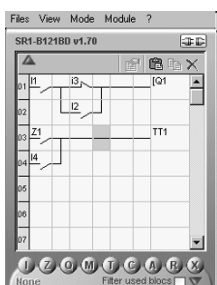
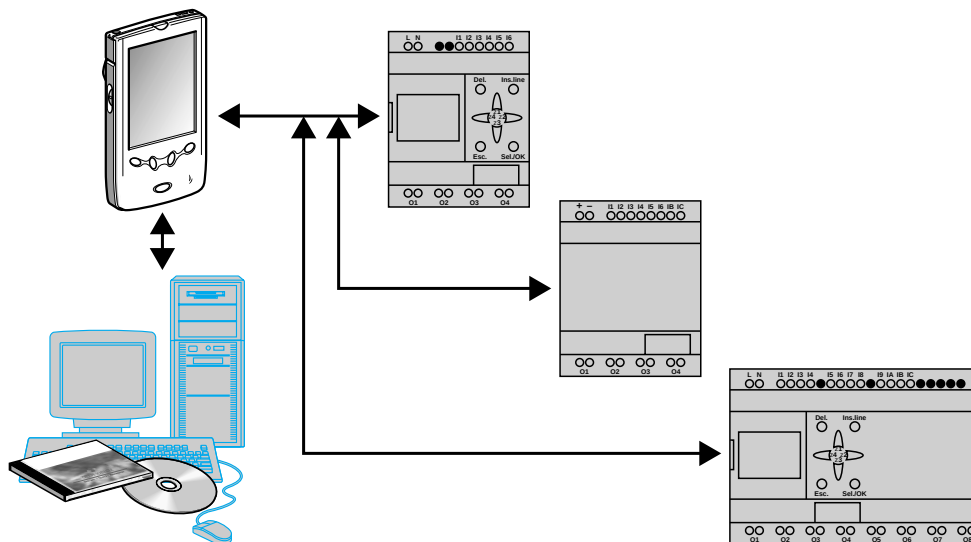
- activate discrete inputs and their contact modes (N/O or N/C, fleeting or continuous),
- display the output states,
- vary the voltage of the analogue inputs Ib and Ic,
- activate the buttons,
- simulate the application programme in real time or accelerated time,
- dynamically display, in red, the various active elements of the programme.

Zelio Soft **supervision** mode makes it possible to test the programme executed by the smart relay, i.e.:

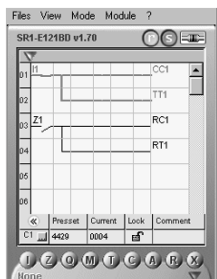
- display the programme “on line”,
- force inputs, outputs, control relays and current values of the function blocks,
- adjust the time,
- change from STOP mode to RUN mode and vice versa.



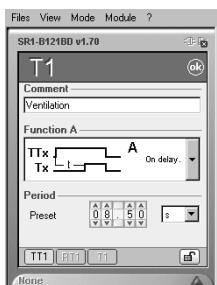
## Zelio Soft software for Pocket PC



Inputting of a control scheme



Programme test with smart relay connected - supervision mode



Configuration of a time delay function block

The Pocket PC allows :

- full entry of control schemes, including the messages to be displayed on the smart relay screen (text blocks),
- transfer of programmes created with Zelio Soft on a PC to the Pocket PC and vice versa,
- transfer of programmes created on a PC or on a Pocket PC to any smart module in the range and vice versa, as well as debugging of programmes while connected or not connected to the smart relay.

The Pocket PC therefore avoids having to move the PC or smart relays for transfer and debugging of applications. It is particularly useful for setting up smart relays which do not have a display or buttons.

Recommended Pocket PCs (1) :

- Hewlett Packard "Jornada 525 or 545", available under Telemecanique reference VW3-A8103●●,
- Hewlett Packard "Jornada 545 and 548", to be ordered directly from an HP dealer,
- Compaq "Ipaq" 3630, to be ordered directly from a Compaq dealer,
- Casio Casiopeia EM 505, to be ordered directly from a Casio dealer.

## Zelio Soft for Pocket PC

Includes virtually all the functions of Zelio Soft software for PC :

- inputting of control schemes in free input mode in a choice of 3 languages - Zelio, Ladder or electrical symbols - with associated comments,
- programme coherence test,
- inputting of text function blocks (text only or text + variables),
- supervision of programmes (2) with :
  - "on line" display of the programme and current values of function blocks,
  - forcing of inputs, outputs, control relays and function block values,
  - adjustment of parameters, date and time,
  - switching from Stop to Run mode.

The software can be quickly installed in the Pocket PC, via a PC, using a special installation CD (ref : SR1-SFT02).

Exchange of files between the Pocket PC and PC is achieved by means of the Active Sync software (version V3.1 or greater) supplied with the Pocket PC.

After having installed the software, the Pocket PC can be used quite independently, as the only programming and adjustment tool for Zelio Logic smart relays.

(1) Likely to change as Pocket PC manufacturers develop their ranges. Please consult your usual supplier.

(2) Only with module versions greater than or equal to V1.7.

## Environmental characteristics

|                                                                      |                                             |     |                                                                                                      |
|----------------------------------------------------------------------|---------------------------------------------|-----|------------------------------------------------------------------------------------------------------|
| Approvals                                                            |                                             |     | UL, CSA, C-TICK, GL                                                                                  |
| Degree of protection                                                 |                                             |     | IP 20                                                                                                |
| Temperature                                                          | Operation                                   | °C  | - 20...+ 55 conforming to IEC 68-2-1 and 68-2-2                                                      |
|                                                                      | Readability of display                      | °C  | 0...+ 55 conforming to IEC 68-2-1 and 68-2-2                                                         |
|                                                                      | Storage                                     | °C  | - 25...+ 70 (conforming to IEC 1131-2)                                                               |
| Maximum relative humidity                                            |                                             | %   | 95 without condensation or dripping water                                                            |
| Altitude                                                             |                                             | m   | 0...2000                                                                                             |
| Mechanical resistance                                                | Immunity to vibrations                      |     | Conforming to standard IEC 68-2-6, test Fc                                                           |
|                                                                      | Immunity to mechanical shock                |     | Conforming to standard IEC 68-2-27, test Ea                                                          |
| Resistance to electrostatic discharge                                | Immunity to electrostatic discharge         |     | Conforming to standard IEC 61000-4-2, level 3 (1)                                                    |
| Resistance to HF interference                                        | Immunity to electromagnetic radiated fields |     | Conforming to standard IEC 61000-4-3, level 3 (1)                                                    |
|                                                                      | Immunity to rapid pulsed transients         |     | Conforming to standard IEC 61000-4-4, level 3 (1)                                                    |
|                                                                      | Immunity to surges                          |     | Conforming to standard IEC 61000-4-5                                                                 |
|                                                                      | Immunity to damped oscillatory waves        |     | Conforming to standard IEC 61000-4-12                                                                |
| Connection to screw terminals<br>(Tightened using Ø 3.5 screwdriver) | Flexible cable with cable end               | mm² | 1 conductor : 0.14...1.5, cable : AWG26...AWG16<br>2 conductors : 0.14...0.75, cable : AWG26...AWG18 |
|                                                                      | Semi-rigid cable                            | mm² | 1 conductor : 0.14...2.5, cable : AWG26...AWG14                                                      |
|                                                                      | Rigid cable                                 | mm² | 1 conductor : 0.14...2.5, cable : AWG26...AWG14<br>2 conductors : 0.14...1.5, cable : AWG26...AWG16  |
|                                                                      | Tightening torque                           | N.m | 0.6                                                                                                  |

## Supply characteristics —

| Smart relay type      | SR1-                |    | B121JD                     | A101BD<br>B121BD | A201BD<br>B201BD | B122BD |
|-----------------------|---------------------|----|----------------------------|------------------|------------------|--------|
| Primary               | Nominal voltage     | V  | — 12                       | — 24             |                  |        |
| Voltage limits        | Including ripple    | V  | 10.4...14.4                | 19.2...30        |                  |        |
| Nominal input current |                     | mA | 105                        | 83               | 130              | 45     |
| Heat dissipation      |                     | W  | 1.3                        | 1.6              | 2.9              | 1.1    |
| Micro-breaks          | Acceptable duration |    | ≤ 1 ms, repeated 20 times  |                  |                  |        |
| Protection            |                     |    | Against polarity inversion |                  |                  |        |

## Supply characteristics ~

| Smart relay type      | SR1-                |    | B101B                      | B201B | A101FU<br>B101FU             | A201FU<br>B201FU             |
|-----------------------|---------------------|----|----------------------------|-------|------------------------------|------------------------------|
| Primary               | Nominal voltage     | V  | ~ 24                       |       | ~ 100...240                  |                              |
| Voltage limits        | Including ripple    | V  | ~ 20.4...26.4              |       | ~ 85...264                   |                              |
| Nominal frequency     |                     | Hz | 50-60 (47...63)            |       |                              |                              |
| Nominal input current |                     | mA | 80                         | 130   | ~ 100 V ≤ 50<br>~ 240 V ≤ 27 | ~ 100 V ≤ 80<br>~ 240 V ≤ 40 |
| Heat dissipation      |                     | W  | 3                          | 5     | 3                            | 5.3                          |
| Micro-breaks          | Acceptable duration |    | ≤ 10 ms, repeated 20 times |       |                              |                              |
| Isolation voltage     | Primary/earth       | V  | 2000 (50-60 Hz)            |       |                              |                              |

## Processing characteristics

| Smart relay type                      | SR1-                          |    | A1●●●●, B1●●●●                                                      | A2●●●●, B2●●●●                                           |
|---------------------------------------|-------------------------------|----|---------------------------------------------------------------------|----------------------------------------------------------|
| Number of control scheme lines        |                               |    | 60                                                                  | 80                                                       |
| Maximum cycle time                    |                               | ms | 6                                                                   | 8                                                        |
| Response time (2)                     |                               | ms | 12 to 24 (SR1-B121JD and ●1●●BD)<br>20 to 40 (SR1-●101FU and ●101B) | 14 to 26 (SR1-●201BD)<br>22 to 42 (SR1-●201FU and ●201B) |
| Back-up time in case of power failure | Day/time                      | h  | ≥ 150 at 40 °C only applicable to SR1-B and SR1-E (4)               |                                                          |
|                                       | Programme and adjustments     |    | For life, internal EEPROM                                           |                                                          |
|                                       | Current values and states (3) |    | For life, internal EEPROM on smart relays SR1B/SR1E only (4)        |                                                          |
| Programme memory checking             |                               |    | At each power-up                                                    |                                                          |
| Clock drift                           |                               | s  | ≤ 6 per month                                                       |                                                          |
| Time delay block accuracy             |                               |    | ± 12 ms ± 0.5 % of the time displayed                               |                                                          |

(1) Minimum level under test conditions defined by the standards.

(2) Time between change of state of an input and change of state of an output directly linked by the programme in the same cycle

(3) The values and states to be saved must be configured in the remanence menu.

(4) As from product version V1.7.

Presentation :  
pages 14100/2 to 14100/7

References :  
pages 14100/12 and

14100/13  
Dimensions :

page 14100/14  
Schemes :

pages 14100/14 and  
14100/15

## Discrete 24 V input characteristics

| Smart relay type             |         |                            | SR1-●●●●BD      | SR1-●●●●JD            | SR1-●●●BD | SR1-●●●JD            |       |    |
|------------------------------|---------|----------------------------|-----------------|-----------------------|-----------|----------------------|-------|----|
|                              |         | Input                      |                 | I1 to IA              |           | IB and IC            |       |    |
| Connection                   |         |                            | Screw terminals |                       |           | Screw terminals      |       |    |
| Nominal value of inputs      |         | Voltage                    | V               | 24                    | 12        | 24                   | 12    |    |
|                              |         | Current                    | mA              | 3                     | 3         | 0.62                 | 0.21  |    |
| Input switching limit values | State 1 | Voltage                    | V               | ≥ 15                  | ≥ 6.5     | ≥ 9.9                | ≥ 9.9 |    |
|                              |         | Current                    | mA              | > 1.8                 | > 1.6     | 0.16                 | 0.16  |    |
|                              | State 0 | Voltage                    | V               | < 5                   | < 6.2     | < 5                  | < 5   |    |
|                              |         | Current                    | mA              | < 0.5                 | < 1.5     | 0.08                 | 0.08  |    |
|                              |         | Input impedance at state 1 |                 | kΩ                    | 8         | 4                    | 38    | 57 |
|                              |         |                            |                 |                       |           |                      |       |    |
| Configurable response time   |         | State 0 to 1               | ms              | 0.3 (fast)...3 (slow) |           | 3 (not configurable) |       |    |
|                              |         | State 1 to 0               | ms              | 0.5 (fast)...5 (slow) |           | 5 (not configurable) |       |    |
| Conformity to IEC 1131-2     |         |                            |                 | Yes, type 1           |           | No                   |       |    |
| Sensor compatibility         |         | 3-wire                     |                 | Yes PNP               |           | Yes                  |       |    |
|                              |         | 2-wire                     |                 | No                    |           | No                   |       |    |
| Type of input                |         |                            |                 | Resistive             |           |                      |       |    |
| Isolation                    |         | Between supply and inputs  |                 | None                  |           |                      |       |    |
|                              |         | Between inputs             |                 | None                  |           |                      |       |    |
| Maximum counting frequency   |         |                            | Hz              | 60                    |           |                      |       |    |

## AC input characteristics

| Smart relay type             |                           |           | SR1-●●01FU                                  | SR1-●●01B       |
|------------------------------|---------------------------|-----------|---------------------------------------------|-----------------|
| Connection                   |                           |           | Screw terminals                             | Screw terminals |
| Nominal value of inputs      |                           | Voltage   | ~ 100...240                                 | ~ 24            |
|                              |                           | Current   | 0.65 (U = 115 V)<br>1.3 (U = 240 V)         | 3 (U = 24 V)    |
|                              |                           | Frequency | 47...63                                     | 47...63         |
| Input switching limit values | At state 1                | Voltage   | ≥ 79                                        | ≥ 12            |
|                              |                           | Current   | ≥ 0.4 (U = 240 V)                           | ≥ 1.5           |
|                              | At state 0                | Voltage   | < 40                                        | < 5             |
|                              |                           | Current   | < 0.3                                       | < 0.6           |
| Response time                | State 0 to 1              | 50/60 Hz  | 45...50 (U = 110 V),<br>85...90 (U = 240 V) | 18...22         |
|                              | State 1 to 0              | 50/60 Hz  | 45...50 (U = 110 V),<br>18...22 (U = 240 V) | 23...25         |
| Isolation                    | Between supply and inputs |           | None                                        | None            |
|                              | Between inputs            |           | None                                        | None            |
| Maximum counting frequency   |                           | Hz        | 10                                          | 10              |

## Integral analogue input characteristics

| Smart relay type |                                   |          | SR1-B●●●BD                                       | SR1-B121JD |
|------------------|-----------------------------------|----------|--------------------------------------------------|------------|
| Analogue inputs  | Number of channels                |          | 2                                                |            |
|                  | Voltage range of input            | V        | 0...10                                           |            |
|                  | Input impedance                   | kΩ       | 62.5 to 10 V                                     |            |
|                  | Maximum non destructive voltage   | V        | ± 30                                             | ± 15       |
| Conversion       | Resolution                        |          | 8 bits                                           |            |
|                  | Conversion time                   |          | Relay cycle time                                 |            |
|                  | Precision                         | at 25 °C | ± 1.6 % of the full range                        |            |
|                  |                                   | at 60 °C | ± 2.9 % of the full range                        |            |
|                  | Repeat accuracy                   | at 55 °C | < 0.1 % of the full range                        |            |
| Isolation        | Between analogue channel & supply | V        | None                                             |            |
| Cabling distance |                                   | m        | 10 max with screened cable (sensor not isolated) |            |

## Relay output characteristics (screw terminal connections) (1)

| Smart relay type                                   |                                  |       | SR1-B121JD, SR1-●1●1BD, SR1-●101FU, SR1-●101B                                                                                                        | SR1-●201BD, SR1-●201FU, SR1-●201B |
|----------------------------------------------------|----------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Number of outputs                                  | Without common potential         |       | 4                                                                                                                                                    | 8                                 |
| Operating limit values                             |                                  | V     | --- 5...150, ~ 24...250                                                                                                                              |                                   |
| Contact type                                       |                                  |       | N/O                                                                                                                                                  |                                   |
| Thermal current                                    |                                  | A     | 8                                                                                                                                                    |                                   |
| Electrical durability for 500 000 operating cycles | Utilisation category             | DC-12 | V                                                                                                                                                    | 24                                |
|                                                    |                                  |       | A                                                                                                                                                    | 1.5                               |
|                                                    |                                  | DC-13 | V                                                                                                                                                    | 24 V L/R = 10 ms                  |
|                                                    |                                  |       | A                                                                                                                                                    | 0.6                               |
|                                                    |                                  | AC-12 | V                                                                                                                                                    | 230                               |
|                                                    |                                  |       | A                                                                                                                                                    | 1.5                               |
|                                                    |                                  | AC-15 | V                                                                                                                                                    | 230                               |
|                                                    |                                  |       | A                                                                                                                                                    | 0.9                               |
| Minimum switching capacity                         | At 5 V minimum voltage           | mA    | 10                                                                                                                                                   |                                   |
| Lower power switching reliability of contact       |                                  |       | 17 V - 5 mA                                                                                                                                          |                                   |
| Maximum operating rate                             | No-load                          | Hz    | 10                                                                                                                                                   |                                   |
|                                                    | At I <sub>e</sub>                | Hz    | 0.5                                                                                                                                                  |                                   |
| Mechanical life                                    | In millions of operating cycles  |       | 10                                                                                                                                                   |                                   |
| Rated impulse withstand voltage                    | Conforming to IEC 947-1          | kV    | 2.5                                                                                                                                                  |                                   |
| Response time                                      | Trip                             | ms    | 10                                                                                                                                                   |                                   |
|                                                    | Reset                            | ms    | 5                                                                                                                                                    |                                   |
| Built-in protection                                | Against short-circuit            |       | None. The use of a protection device (fuse or circuit-breaker) is recommended for each channel or group of channels                                  |                                   |
|                                                    | Against overvoltage and overload |       | None. Connect, in parallel to the terminals of each preactuator, an RC circuit, MOV (ZNO) suppressor or an appropriately sized diode for the voltage |                                   |

## Transistor output characteristics (screw terminal connections)

| Smart relay type       |                                         |    | SR1-B122BD                                                                                           |
|------------------------|-----------------------------------------|----|------------------------------------------------------------------------------------------------------|
| Number of outputs      | With positive polarity common potential |    | 4 (PNP)                                                                                              |
| Operating limit values |                                         | V  | 19.2...30                                                                                            |
| Loads                  | Nominal voltage                         | V  | --- 24                                                                                               |
|                        | Nominal current                         | A  | 0.5                                                                                                  |
|                        | Maximum current                         | A  | 0.625 at 30 V                                                                                        |
| Drop out voltage       | At state 1                              | V  | ≤ 2 for I = 0.5 A                                                                                    |
| Response time          | Trip                                    | ms | ≤ 1                                                                                                  |
|                        | Reset                                   | ms | ≤ 1                                                                                                  |
| Built-in protection    |                                         |    | Against overload and short-circuits<br>Against overvoltage (2)<br>Against inversions of power supply |

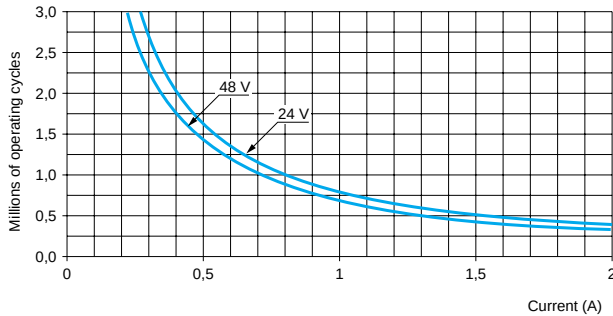
(1) Characteristics at 55 °C for 60 % loading of inputs/outputs or at 45 °C for 100 % loading of inputs/outputs.

(2) If there is no volt-free contact between the relay output and the load.

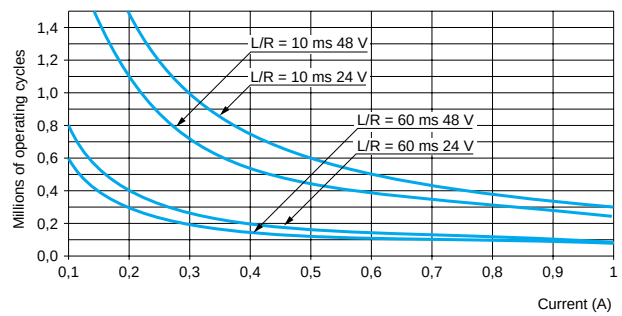
## Electrical durability of relay outputs (in millions of operating cycles) (conforming to IEC 947-5-1)

## d.c. loads

DC-12 (1)

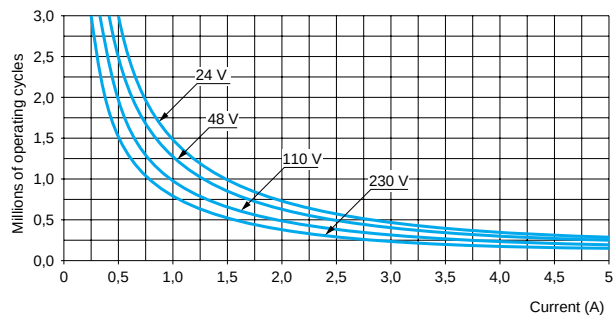


DC-13 (2)

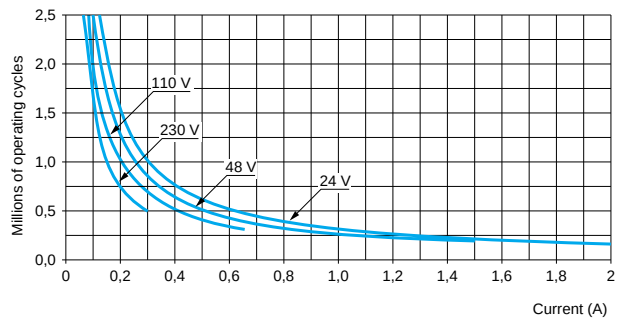


## a.c. loads

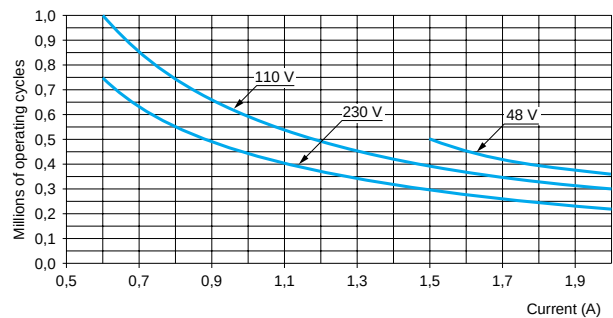
AC-12 (3)



AC-14 (4)



AC-15 (5)



(1) DC-12 : switching resistive loads and photo-coupler isolated solid state loads,  $L/R \leq 1\text{ms}$ .

(2) DC-13 : switching electromagnets,  $L/R \leq 2 \times (U_e \times I_e)$  in ms,  $U_e$  : rated operational voltage,  $I_e$  : rated operational current (with protection diode on load, use the DC-12 curves and apply a coefficient of 0.9 to the millions of operating cycles value).

(3) AC-12 : switching resistive loads and photo-coupler isolated solid state loads  $\cos \geq 0.9$ .

(4) AC-14 : switching small electromagnetic loads whose power drawn with the electromagnet closed is  $\leq 72\text{ VA}$ , making :  $\cos = 0.3$ , breaking :  $\cos = 0.3$ .

(5) AC-15 : switching electromagnetic loads whose power drawn with the electromagnet closed is  $> 72\text{ VA}$ , making :  $\cos = 0.7$ , breaking :  $\cos = 0.4$ .



SR1-B121BD



SR1-A201BD



SR1-E121BD

## Smart relays

| Number of I/O                             | Discrete inputs        | Outputs        | Clock | Remanence function (1) | Reference   | Weight kg |
|-------------------------------------------|------------------------|----------------|-------|------------------------|-------------|-----------|
| <b>Supply <math>\equiv</math> 12 V</b>    |                        |                |       |                        |             |           |
| 12                                        | 8 I $\equiv$ 12 V (2)  | 4 O relay      | Yes   | Yes (3)                | SR1-B121JD  | 0.290     |
| <b>Supply <math>\equiv</math> 24 V</b>    |                        |                |       |                        |             |           |
| 10                                        | 6 I $\equiv$ 24 V      | 4 O relay      | No    | No (4)                 | SR1-A101BD  | 0.290     |
| 12                                        | 8 I $\equiv$ 24 V (2)  | 4 O relay      | Yes   | Yes (3)                | SR1-B121BD  | 0.290     |
|                                           |                        | 4 S transistor | Yes   | Yes (3)                | SR1-B122BD  | 0.290     |
| 20                                        | 12 I $\equiv$ 24 V     | 8 O relay      | No    | No (4)                 | SR1-A201BD  | 0.350     |
|                                           | 12 I $\equiv$ 24 V (2) | 8 S relay      | Yes   | Yes (3)                | SR1-B201BD  | 0.350     |
| <b>Supply <math>\sim</math> 24 V</b>      |                        |                |       |                        |             |           |
| 10                                        | 6 I $\sim$ 24 V        | 4 O relay      | Yes   | Yes (3)                | SR1-B101B ▲ | 0.290     |
| 20                                        | 12 I $\sim$ 24 V       | 8 O relay      | Yes   | Yes (3)                | SR1-B201B ▲ | 0.350     |
| <b>Supply <math>\sim</math> 100/240 V</b> |                        |                |       |                        |             |           |
| 10                                        | 6 I $\sim$ 100/240 V   | 4 O relay      | No    | No (4)                 | SR1-A101FU  | 0.290     |
|                                           |                        |                | Yes   | Yes (3)                | SR1-B101FU  | 0.290     |
| 20                                        | 12 I $\sim$ 100/240 V  | 8 O relay      | No    | No (4)                 | SR1-A201FU  | 0.350     |
|                                           |                        |                | Yes   | Yes (3)                | SR1-B201FU  | 0.350     |

## Smart relays without display and without buttons

|                                           |                       |           |     |         |            |       |
|-------------------------------------------|-----------------------|-----------|-----|---------|------------|-------|
| <b>Supply <math>\equiv</math> 24 V</b>    |                       |           |     |         |            |       |
| 10                                        | 6 I $\equiv$ 24 V     | 4 O relay | No  | No (4)  | SR1-D101BD | 0.270 |
| 12                                        | 8 I $\equiv$ 24 V (1) | 4 O relay | Yes | Yes (3) | SR1-E121BD | 0.270 |
| <b>Supply <math>\sim</math> 100/240 V</b> |                       |           |     |         |            |       |
| 10                                        | 6 I $\sim$ 100/240 V  | 4 O relay | No  | No (4)  | SR1-D101FU | 0.270 |
|                                           |                       |           | Yes | Yes (3) | SR1-E101FU | 0.270 |

- (1) Counting or elapsed time values saved in the event of a power failure.  
 (2) Including 2 configurable analogue inputs.  
 (3) Functions available with product version  $\geq$  V 1.7 :  
 10 time delay blocks, of which 2 with remanence function  
 10 counter blocks, of which 5 with remanence function  
 6 text blocks  
 Supervision mode with Zelio Soft V1.5.  
 (4) 8 time delay blocks  
 8 counter blocks  
 4 text blocks

▲ Available : 1st quarter 2002.

530034



ABL-7RM2401

## Power supply (1)

| Input voltage             | Nominal output voltage | Nominal output current | Reference          | Weight kg |
|---------------------------|------------------------|------------------------|--------------------|-----------|
| 100...240 V<br>47...63 Hz | --- 12 V               | 1.9 A                  | <b>ABL-7RM1202</b> | 0.180     |
|                           | --- 24 V               | 1.4 A                  | <b>ABL-7RM2401</b> | 0.182     |

## Separate components

| Description                  | Reference        | Weight kg |
|------------------------------|------------------|-----------|
| <b>EEPROM back-up memory</b> | <b>SR1-MEM01</b> | 0.001     |

## Zelio Soft software for PC

| Description                                                                | Reference        | Weight kg |
|----------------------------------------------------------------------------|------------------|-----------|
| <b>Smart relay-PC connecting cable</b><br>length 1.8 m                     | <b>SR1-CBL01</b> | 0.350     |
| <b>Kit comprising :</b><br>- “Zelio soft” programming software<br>- cable. | <b>SR1-KIT01</b> | 0.500     |
| <b>Zelio Soft multi-language programming software for PC (2)</b>           | <b>SR1-SFT01</b> | 0.150     |

|            | SR1-          | A●●●● | B●01B | B●●1BD  | B●01FU  | B122BD  | B121JD | D●●●● | E●●●●   |
|------------|---------------|-------|-------|---------|---------|---------|--------|-------|---------|
| Zelio Soft | Version 1.2   | Yes   | No    | Yes (3) | Yes (3) | No      | No     | No    | No      |
|            | Version 1.3   | Yes   | No    | Yes (5) | Yes (5) | Yes (5) | No     | No    | No      |
|            | Version 1.4   | Yes   | No    | Yes (5) | Yes (5) | Yes (5) | No     | Yes   | Yes (5) |
|            | ≥ Version 1.5 | Yes   | Yes   | Yes     | Yes     | Yes     | Yes    | Yes   | Yes     |

## Zelio Soft software for Pocket PC

| Description                                                                                            | Reference              | Weight kg |
|--------------------------------------------------------------------------------------------------------|------------------------|-----------|
| <b>Connecting cable between Sub-D-9 connector on the Pocket PC and the smart relay</b>                 | <b>SR1-CBL02</b>       | 0.350     |
| <b>Programming software for Pocket PC</b><br>(also contains Zelio Soft multi-language software for PC) | <b>SR1-SFT02</b>       | 0.150     |
| <b>"Jornada 525" Pocket PC</b>                                                                         | <b>VW3-A8103●● (4)</b> | 0.300     |

## Documentation

| Description                                                         | Language | Reference          | Weight kg |
|---------------------------------------------------------------------|----------|--------------------|-----------|
| <b>User's guide</b><br>for direct programming<br>on the smart relay | English  | <b>SR1-MAN01EN</b> | 0.100     |
|                                                                     | French   | <b>SR1-MAN01FR</b> | 0.100     |
|                                                                     | German   | <b>SR1-MAN01DE</b> | 0.100     |
|                                                                     | Spanish  | <b>SR1-MAN01ES</b> | 0.100     |
|                                                                     | Italian  | <b>SR1-MAN01IT</b> | 0.100     |

(1) See module 14061/5.

(2) FR/EN/DE/ES/IT/PO/NL - Contains on-line User's Guide that can be displayed on a PC.

(3) Only for earlier version smart relays V1.1 and V1.2.

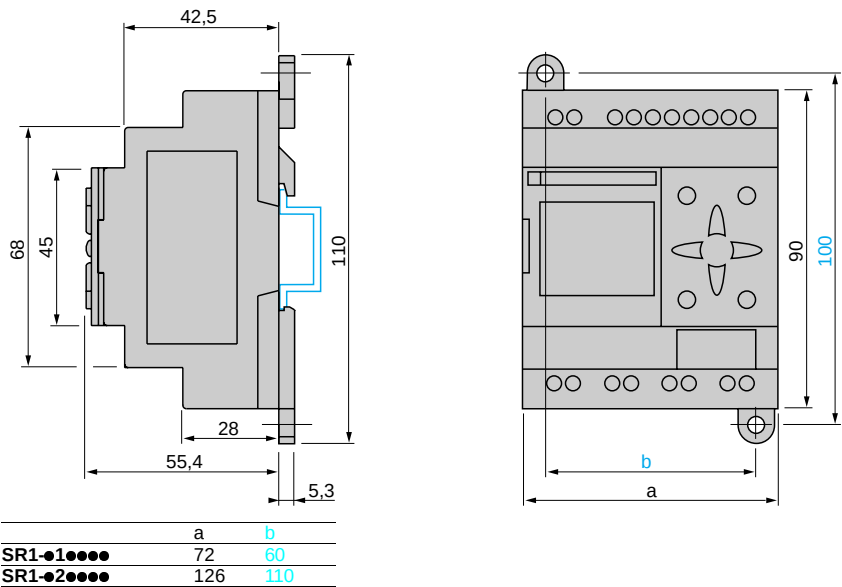
(4) To order an operating system in the required language, replace the ●● in the reference with **FR** for French, **EN** for English, **DE** for German, **SP** for Spanish, **IT** for Italian, **PO** for Portuguese, **NL** for Dutch.

(5) Only for smart relay versions V1.1, V1.2, V1.5 and V1.6.

Presentation :  
pages 14100/2 to 14100/7Characteristics :  
pages 14100/8 to 14100/11  
Dimensions :page 14100/14  
Schemes :pages 14100/14 and  
14100/15

Dimensions

Smart relays SR1-SR1-●●●●●

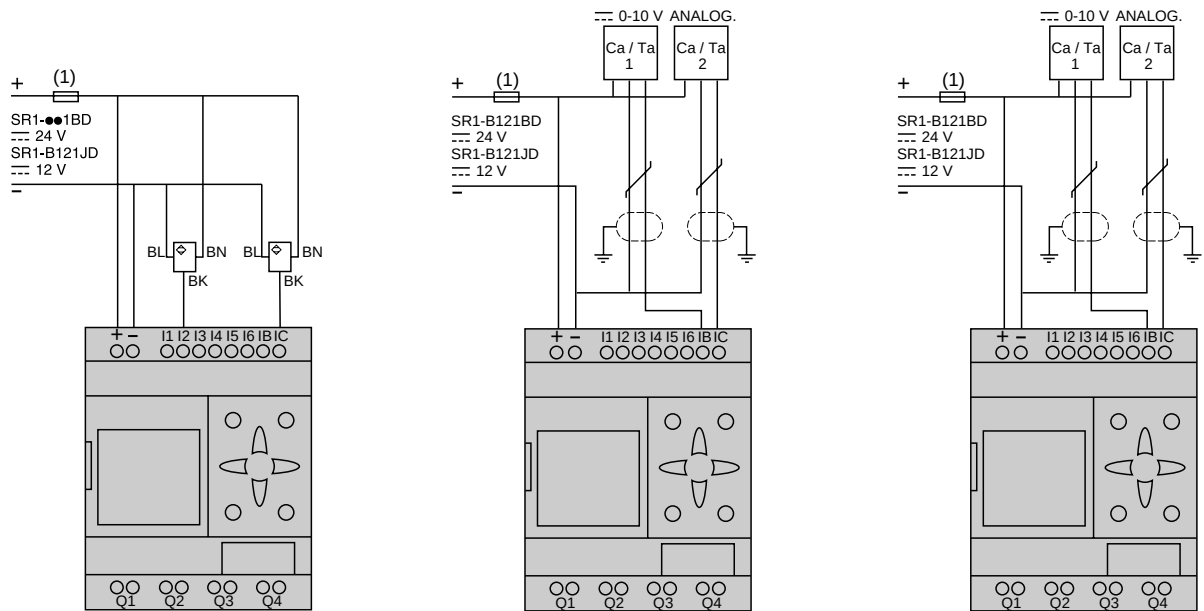


Schemes

3-wire sensors  
on SR1-●●1BD, SR1-B121JD

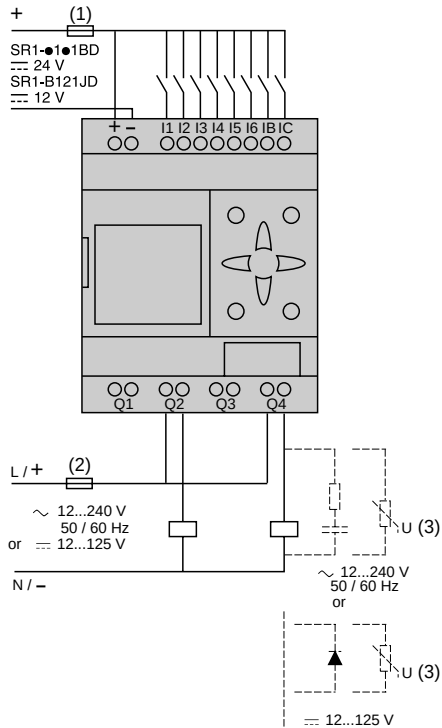
Analogue inputs  
on SR1-B121BD, SR1-B121JD

on SR1-B201BD

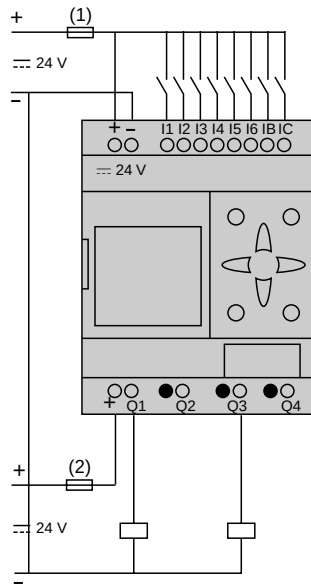


(1) 1 A quick-blow fuse or circuit-breaker.

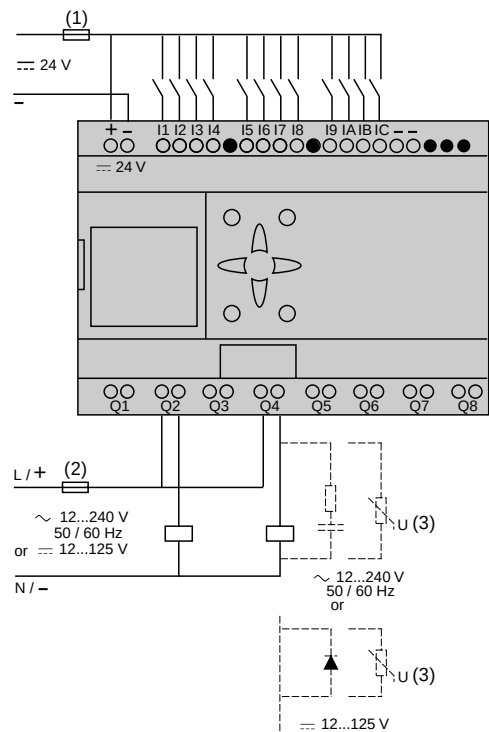
**SR1-●1●1BD, B121JD**



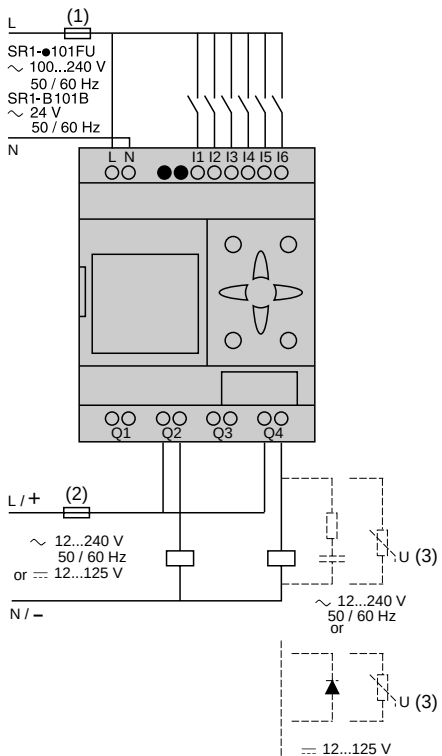
**SR1-B122BD**



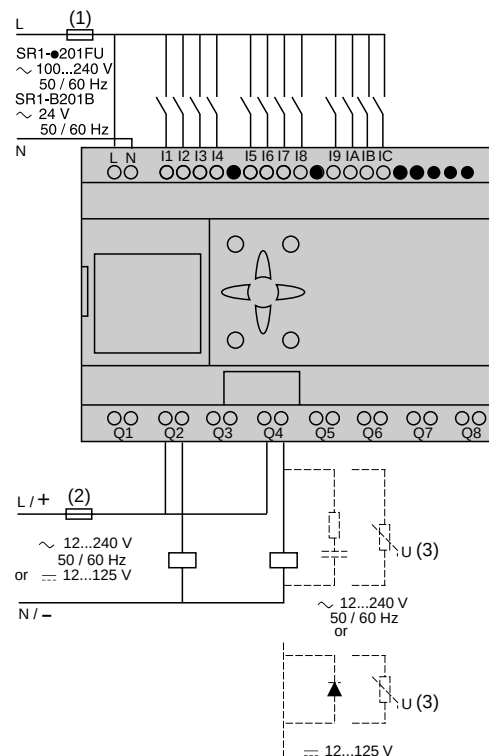
**SR1-●201BD**



**SR1-●101FU  
 SR1-●101B**



**SR1-●201FU  
 SR1-●201B**



- (1) 1A quick-blow fuse or circuit-breaker.  
 (2) 16A fuse or circuit-breaker (B16).  
 (3) Inductive load.

Presentation :  
 pages 14100/2 to 14100/7

Characteristics :  
 pages 14100/8 to 14100/

11  
 References :

pages 14100/12 and  
 14100/13

Dimensions :  
 pages 14100/14